

**We claim:**

1. A radiographic imaging assembly that has a system speed of at least 200 and comprises:

A) a symmetric radiographic silver halide film having a film speed of at least 700 and comprising a support that has first and second major surfaces and that is capable of transmitting X-radiation,

said radiographic silver halide film having disposed on said first major support surface, two or more hydrophilic colloid layers including first and second silver halide emulsion layers, and having on said second major support surface, two or more hydrophilic colloid layers including third and fourth silver halide emulsion layers, said first and third silver halide emulsion layers being the outermost emulsion layers on their respective sides of said support,

each of said first, second, third, and fourth silver halide emulsion layers comprising tabular silver halide grains that have the same or different composition and independently an aspect ratio of at least 35 and an average grain diameter of at least 3.0  $\mu\text{m}$ , and comprise at least 90 mol % bromide and up to 3 mol % iodide, both based on total silver in said grains,

said second and fourth silver halide emulsion layers further comprising a crossover control agent sufficient to reduce crossover to less than 10%, and

B) a fluorescent intensifying screen arranged on each side of said radiographic silver halide film, said screen having a screen speed of at least 100 and a screen sharpness measurement (SSM) value greater than reference Curve A of FIG. 4, and comprising an inorganic phosphor capable of absorbing X-rays and emitting electromagnetic radiation having a wavelength greater than 300 nm, said inorganic phosphor being coated in admixture with a polymeric binder in a phosphor layer onto a flexible support and having a protective overcoat disposed over said phosphor layer,

wherein said flexible support comprises a reflective substrate comprising a continuous polyester first phase and second phase dispersed within

said continuous polyester first phase, said second phase comprised of microvoids containing inorganic particles.

2. The radiographic imaging assembly of claim 1 wherein said tabular silver halide grains in said first, second, third, and fourth silver halide emulsion layers are composed of at least 95 mol % bromide and up to 0.5 mol % iodide, both based on total silver in the emulsion layer.

3. The radiographic imaging assembly of claim 1 wherein said tabular silver halide grains in said first, second, third, and fourth silver halide emulsion layers independently have an aspect ratio of from about 42 to about 50, an average grain diameter of at least 4.0  $\mu\text{m}$  and independently an average thickness of from about 0.08 to about 0.12  $\mu\text{m}$ .

4. The radiographic imaging assembly of claim 1 wherein said tabular silver halide grains in said first, second, third, and fourth silver halide emulsion layers have essentially the same aspect ratio of from about 42 to about 50, an average grain diameter of at least 4.0  $\mu\text{m}$ , and essentially the same average thickness of from about 0.09 to about 0.11  $\mu\text{m}$ .

5. The radiographic imaging assembly of claim 1 wherein said tabular silver halide grains in said first, second, third, and fourth silver halide emulsion layers are dispersed in a hydrophilic polymeric vehicle mixture comprising at least 0.25% of oxidized gelatin, based on the total dry weight of said hydrophilic polymeric vehicle mixture, and

6. The radiographic imaging assembly of claim 1 wherein said tabular AgX grains in said first, second, third, and fourth silver halide emulsion layers are dispersed up to 1.5% deionized oxidized gelatin, based on total dry weight of said hydrophilic polymeric vehicle mixture.

7. The radiographic imaging assembly of claim 6 wherein said tabular AgX grains in said first, second, third, and fourth silver halide emulsion layers are dispersed in from about 0.4 to about 0.6% deionized oxidized gelatin, based on total dry weight of said hydrophilic polymeric vehicle mixture.

8. The radiographic imaging assembly of claim 1 wherein the dry, unprocessed thickness ratio of said first silver halide emulsion layer to that of said second silver halide emulsion layer is greater than 1:1, and the dry, unprocessed thickness ratio of said third silver halide emulsion layer to that of said fourth silver halide emulsion layer is independently greater than 1:1.

9. The radiographic imaging assembly of claim 1 wherein the molar ratio of silver in said first silver halide emulsion layer to that of said second silver halide emulsion layer is greater than 1:1, and the molar ratio of silver in said third silver halide emulsion layer to that of said fourth silver halide emulsion layer is independently greater than 1:1, the amount polymer vehicle on each side of said support is from about 30 to about 40 mg/dm<sup>2</sup>, and the level of silver on each side of said support is from about 18 to about 24 mg/dm<sup>2</sup>.

10. The radiographic imaging assembly of claim 1 wherein said crossover control agent in said radiographic silver halide film is present in an amount sufficient to reduce crossover to less than 8%.

11. The radiographic imaging assembly of claim 1 wherein said crossover control agent is a particulate merocyanine or oxonol dye that is present in each of said second and fourth silver halide emulsion layers in an amount of from about 0.75 to about 1.5 mg/dm<sup>2</sup>.

12. The radiographic imaging assembly of claim 1 wherein said inorganic phosphor is a terbium activated gadolinium oxysulfide or barium fluorobromide.

13. The radiographic imaging assembly of claim 1 wherein said inorganic particles are barium sulfate particles.

14. The radiographic imaging assembly of claim 13 wherein the reflective index of said polyester first phase to said second phase is from about 1.4:1 to about 1.6:1, said microvoids occupy from about 35 to about 60% (by volume) of said reflective substrate, said reflective support has a dry thickness of from about 100 to about 400 nm, and the average barium sulfate particle size is from about 0.6 to about 2  $\mu\text{m}$  and comprise from about 35 to about 65 weight % of the total substrate weight.

15. A radiographic imaging assembly having a system speed of at least 225 and comprising:

A) a symmetric radiographic silver halide film having a film speed of at least 800 and comprising a support that has first and second major surfaces and that is capable of transmitting X-radiation,

said radiographic silver halide film having disposed on said first major support surface, two or more hydrophilic colloid layers including first and second silver halide emulsion layers, and having on said second major support surface, two or more hydrophilic colloid layers including third and fourth silver halide emulsion layers, said first and third silver halide emulsion layers being the outermost emulsion layers on their respective sides of said support,

each of said first, second, third, and fourth silver halide emulsion layers comprising tabular silver halide grains that have the same composition, independently an aspect ratio of from about 42 to about 50, an average grain diameter of at least 4.0  $\mu\text{m}$ , and an average thickness of from about 0.08 to about 0.12  $\mu\text{m}$ , and comprise at least 98 mol % bromide and up to 0.5 mol % iodide, both based on total silver in said grains,

each of said second and fourth silver halide emulsion layers comprising a particulate oxonol dye as a crossover control agent present in an

amount of from about 1 to about 1.3 mg/dm<sup>2</sup> that is sufficient to reduce crossover to less than 8% and that is decolorized during development within 45 seconds,

said film further comprising a protective overcoat on both sides of said support disposed over all of said hydrophilic colloid layers,

wherein said tabular silver halide grains in said first, second, third, and fourth silver halide emulsion layers are dispersed in a hydrophilic polymeric vehicle mixture comprising from about 0.25 to about 1.5% of deionized oxidized gelatin, based on the total dry weight of said hydrophilic polymeric vehicle mixture,

wherein the dry, unprocessed thickness ratio of said first silver halide emulsion layer to that of said second silver halide emulsion layer is from about 3:1 to about 1:1, and the dry, unprocessed thickness ratio of said third silver halide emulsion layer to that of said fourth silver halide emulsion layer is independently from about 3:1 to about 1:1, and

wherein the molar ratio of silver in said first silver halide emulsion layer to that of said second silver halide emulsion layer is from about 1.5:1 to about 3:1, and the molar ratio of silver in said third silver halide emulsion layer to that of said fourth silver halide emulsion layer is independently from about 1.5:1 to about 3:1, and

B) a fluorescent intensifying screen having a screen speed of at least 100 and a screen sharpness measurement (SSM) value that is at least 1.1 times more than that of reference Curve A of FIG. 4 at a given spatial frequency, and that comprises a terbium activated gadolinium oxysulfide or barium fluorobromide phosphor capable of absorbing X-rays and emitting electromagnetic radiation having a wavelength greater than 300 nm, said phosphor being coated in admixture with a polymeric binder in a phosphor layer onto a flexible polymeric support and having a protective overcoat disposed over said phosphor layer,

wherein said flexible polymeric support comprises a reflective substrate comprising a continuous biaxially oriented polyester first phase and second phase dispersed within said continuous polyester first phase, said second phase comprised of microvoids occupying from about 35 to about 60% (by

volume) of said reflective substrate, and said microvoids containing barium sulfate particles that have an average particle size of from about 0.06 to about 2  $\mu\text{m}$  and comprise from about 35 to about 65 weight % of the total substrate weight.

16. The radiographic assembly of claim 15 wherein said polyester is biaxially oriented poly(1,4-cyclohexylene dimethylene terephthalate) or poly(ethylene terephthalate).

17. The radiographic imaging assembly of claim 14 wherein two fluorescent intensifying screens are arranged in association with said radiographic silver halide film, one of either side thereof.

18. A method of providing a black-and-white image comprising exposing the radiographic silver halide film in the radiographic imaging assembly of claim 1 and processing said film, sequentially, with a black-and-white developing composition and a fixing composition, the processing being carried out within 90 seconds, dry-to-dry.

19. A method of providing a black-and-white image comprising exposing the radiographic silver halide film in the radiographic imaging assembly of claim 15 and processing said film, sequentially, with a black-and-white developing composition and a fixing composition, the processing being carried out within 90 seconds, dry-to-dry.

20. The method of claim 18 wherein the black-and-white image so provided is used for a medical diagnosis.